Spacecraft Operations Status

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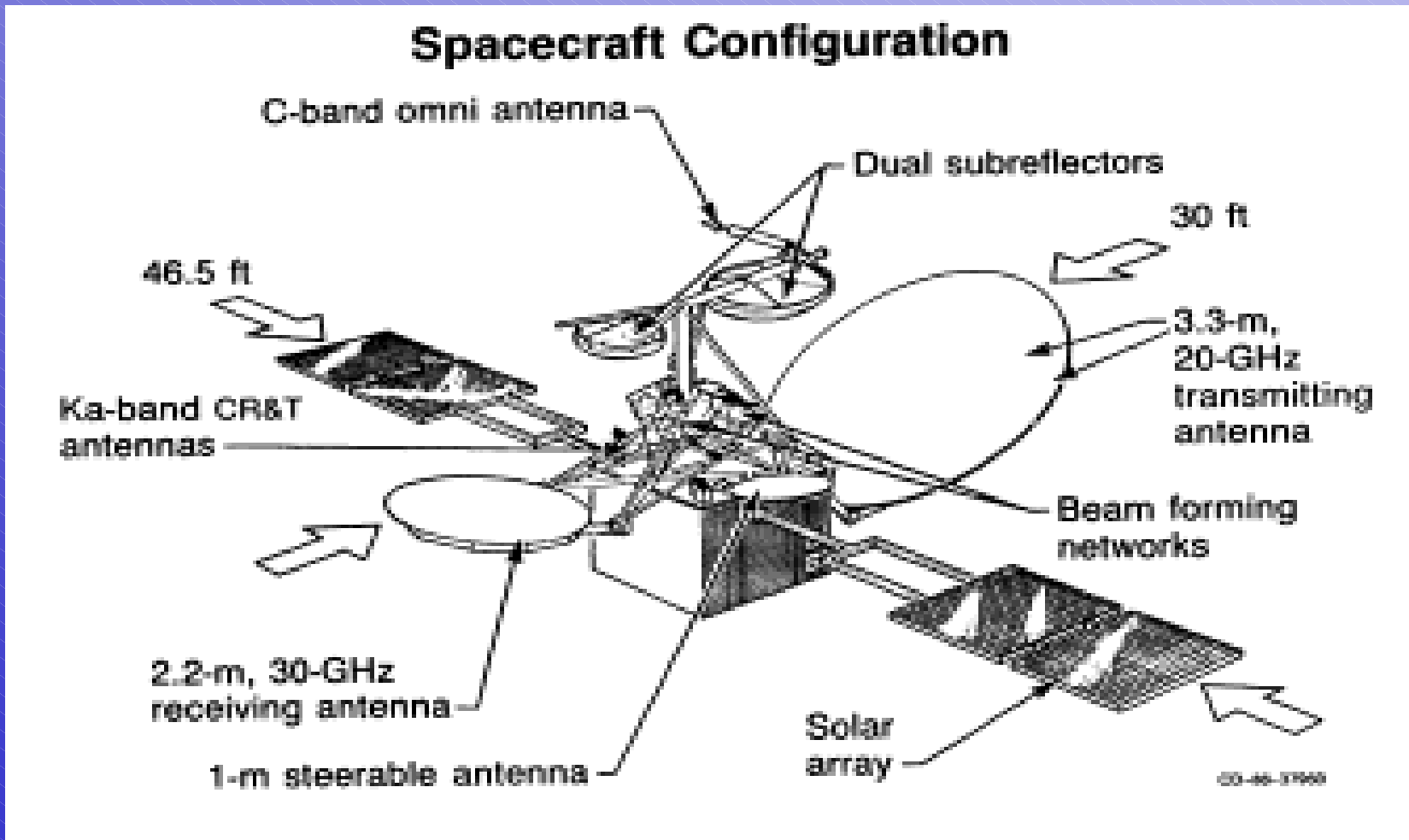
Spacecraft Configuration



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Spacecraft Subsystem Status

Power: Solar array margin (300w.) good for many years on-orbit
Payload shutdown nightly in spring and fall eclipse season.
Battery cells well matched. DOD < 36%

CR&T: Ka band primary. C band backup. Full redundancy except CBT
NGS link margins: TLM: 14 dB
CMD: 21dB hi-rate, 27 dB lo-rate
Periodic ranging for OD and ephemeris generation

Propulsion: No stationkeeping required. Cannot disturb parking orbit stability at 105.2W +/-0.15 °.
Est. <3# fuel. Sufficient for > 4 years momentum unloading .

Thermal: Primary and backup heaters supplement heat pipes

Attitude Control: Redundant hardware. Inclined Orbit Compensation
Autotrack discontinued (too operator intensive as orbit inclination increases)
Earth sensor (pitch, roll) and sun sensor (yaw) inputs to attitude processor.
Momentum wheel and magnetic torquers provide control.
Typical pointing: pitch +/- 0.06°
(Oct. '00) roll +/- 0.1° (until 2° pivot limit ~ Feb. '01)
yaw +/-0.5° " "

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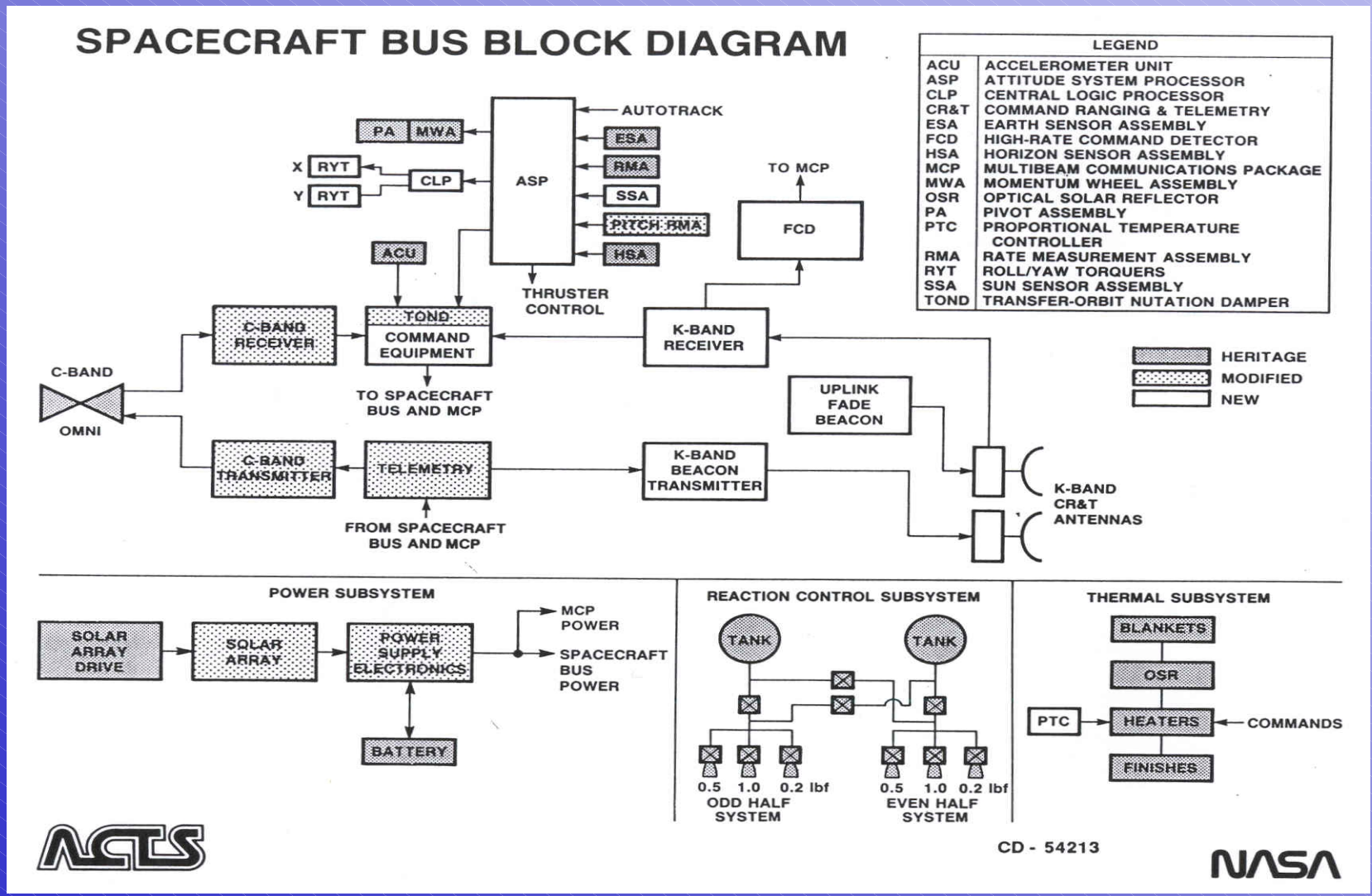
Spacecraft Subsystem Status



Communication Payload Status

Wideband Transponders: 4 for 3 redundancy still available.
46 watt TWTAs with 900 MHz bandwidth
Actual link capacity determined by ground station.

Baseband Processor: Enables DAMA/TDMA network of T1 VSATs via spot beams.
Ground software has range rate/timing limitations in inclined orbit.
Requires fully functional Master Control Station and T1 VSATs
Operation discontinued due to limited resources/excessive overhead.

Microwave Switch Matrix: Enables 3 channel bent-pipe transponder
Controls spot beam selection.
Continues to support USAT links.

Multi-Beam Antenna: Select from 51 spot beams over CONUS
50 spot beams with 0.30° beamwidth, EIRP up to 69 dBW.
Beam pointing relative to Cleveland and attitude stability.
One steerable beam, 1° beamwidth (~10 dB less gain).
MBA periodic thermal distortions characterized.

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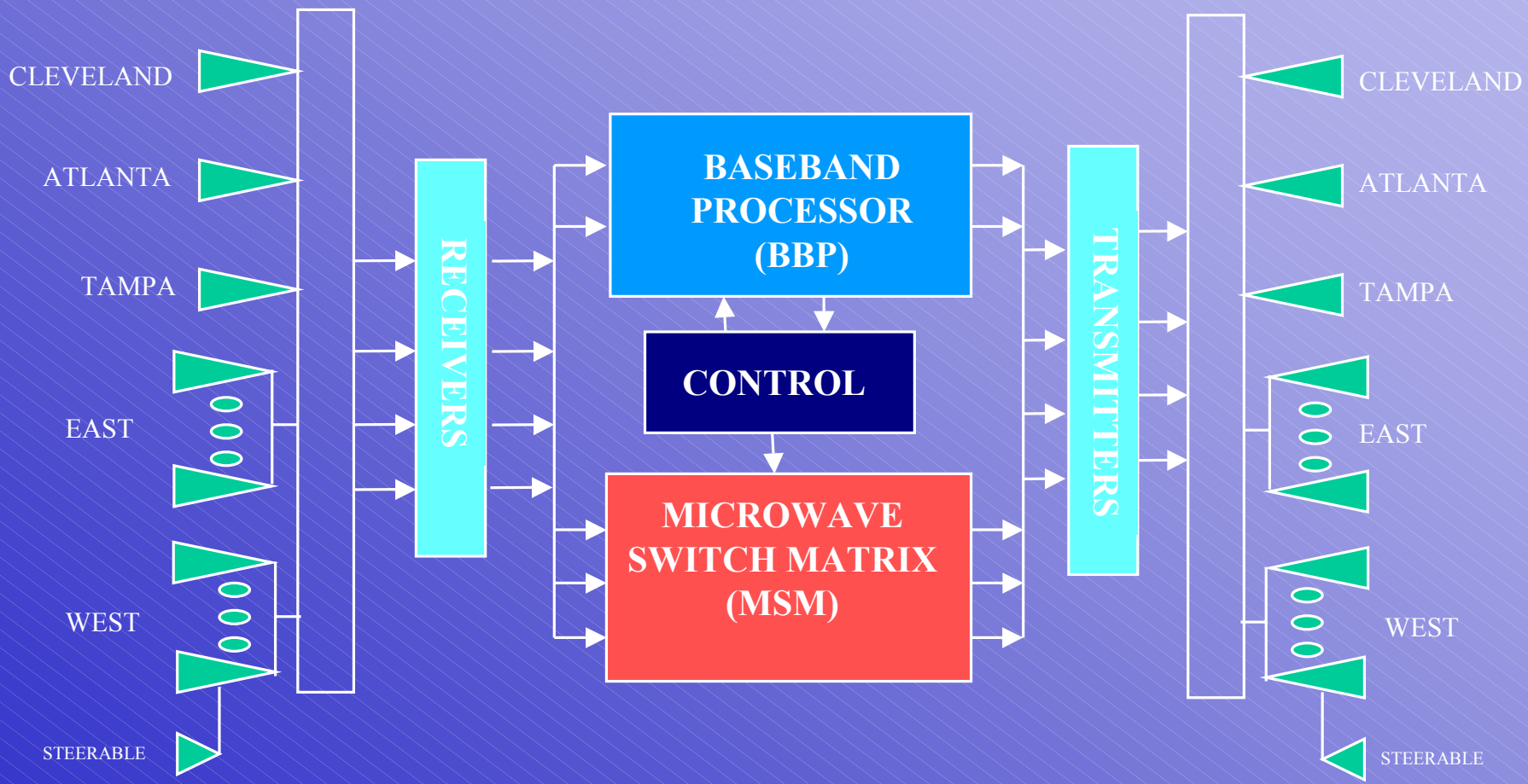
ACTS Communications Payload



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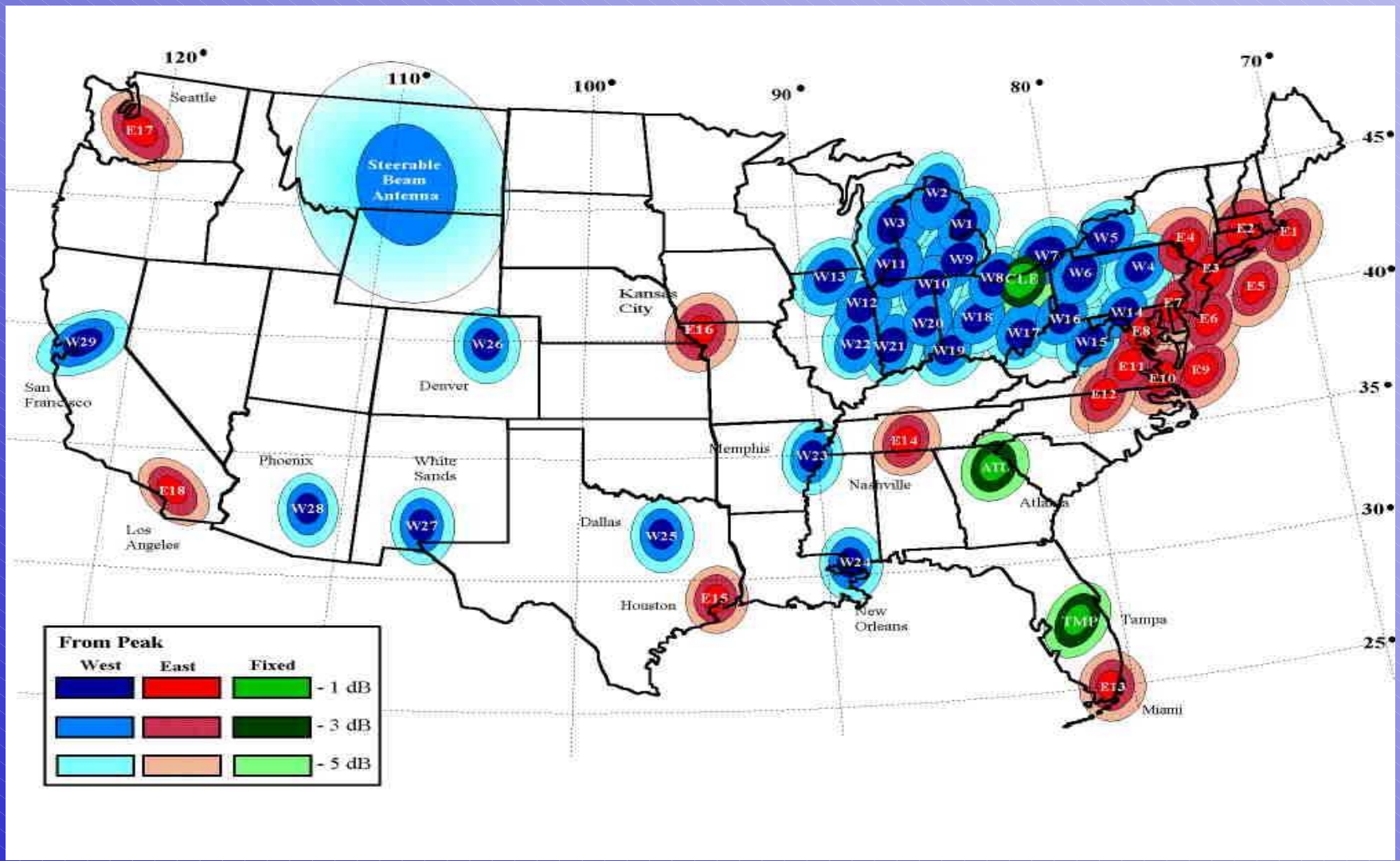
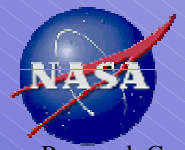
ACTS Spot Beam Location





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ACTS Operations

Spacecraft Control

Lockheed Martin Space Systems (originally RCA) under contract for operations
- manages spacecraft operations and makes recommendations to NASA
- Has core team of experienced personnel at CPC (Newtown, PA)
- Has access to spacecraft designers and analysts
- Familiar with proprietary software, documents and procedures
- Uses GRC NGS (government property) except C-band.

NASA Ground Station

LM Global Telecom (formerly Comsat) under contract for operations & maintenance
- Comsat designed, built and integrated NGS
- Has core team of experienced personnel at NGS
- Entire facility is government property
- Served as Experiment Network Hub
- No new purchases planned. Make best use of existing equipment.

License

NASA experimental license valid until Dec. 31. Extension requested.

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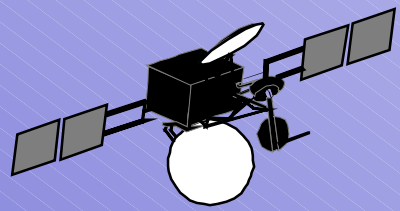
ACTS Operations



NGS @ NASA GRC
RF/TT&C equipment
satellite control consoles
1 or 2 shifts

Phone lines

LM ASOC
Newtown, PA
satellite control consoles
24 x 7 staff

Phone lines

C-band station
RF/TT&C equipment

staff on-call

Maintain antennas and RF equipment
Maintain TT&C equipment
Comm link monitor and diagnostics
Program management
Satellite control backup
Conjunction analysis

Spacecraft engineering
Spacecraft controllers
Orbital analyst
Operations planning
Primary satellite control

Backup RF link

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Ka-Band CR&T Antenna Assembly

Command Receive Pattern—Measured with Surrounding Thermal Blankets
29.975 GHz H-POL